

WHAT IS CLAIMED IS:

fig. 1
66FTD-5562260
5 A semiconductor device, comprising:
a semiconductor substrate having a main surface;
an element isolation region for defining an element forming region
on the main surface of said semiconductor substrate;
8 an isolation region provided in a strip-shape and having a peak
impurity concentration at a prescribed depth position from the main
surface of said semiconductor substrate;
10 10 a connection hole provided piercing through said element [isolating]
region;
an anti-[HF] side wall film not etched by hydrofluoric acid, provided to
cover a side wall of said connection hole at least near a lower end of said
connection hole;
an interconnection layer provided to fill an inner portion of said
connection hole; and
15 an impurity region provided in said semiconductor substrate
extending from the lower end of said connection hole to said isolation region.

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2. The semiconductor device according to claim 1, wherein said
anti-HF side wall film is a nitride film.

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3. The semiconductor device according to claim 2, wherein
said impurity region includes a first impurity region provided to
connect
connected said interconnection layer to said isolation region, and a second
impurity region provided near the lower end of said connection hole and
5 connected to said interconnection layer.

fig. 13
4. The semiconductor device according to claim 1, wherein said
anti-HF side wall film is either a polysilicon film or an amorphous silicon
film.

5. A method of manufacturing a semiconductor device,

comprising the steps of:

forming an element isolating region for defining an element forming region on a semiconductor substrate having a main surface;

5 introducing an impurity to an entire surface of said semiconductor substrate to form a strip-shaped isolation region having a peak impurity concentration at a prescribed depth position from the main surface of said semiconductor substrate;

10 forming a connection hole piercing through said element isolating region;

forming an anti-HF side wall film not etched by hydrofluoric acid, provided to cover a side wall of said connection hole at least near a lower end of said connection hole;

15 introducing an impurity to said semiconductor substrate through said connection hole to form a first impurity region reaching from the lower end of said connection hole to said isolation region;

washing an inner portion of said connection hole by hydrofluoric acid; and

20 forming an interconnection layer to fill the inner portion of said connection hole.

6. The method of manufacturing a semiconductor device according to claim 5, wherein a polysilicon film or an amorphous silicon film is formed in said step of forming the anti-HF side wall film.

7. The method of manufacturing a semiconductor device according to claim 5, wherein said step of forming said anti-HF side wall film includes the steps of forming a nitride film, and before said anti-HF side wall film is formed on the side wall of said connection hole, introducing an impurity to said semiconductor substrate through said connection hole to form a second impurity region near the lower end of said connection hole.